



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER OF PATENTS AND TRADEMARKS  
Washington, D.C. 20231  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/082,264	05/20/1998	JIASHU CHEN	CHEN-1-(5442	2496

7590 04/23/2002

ANTHONY EDW J CAMPBELL  
LOCKE PURNELL RAIN HARRELL  
2200 ROSS AVENUE SUITE 2200  
DALLAS, TX 75201

EXAMINER

GRIER, LAURA A

ART UNIT

PAPER NUMBER

2644

DATE MAILED: 04/23/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

09/082,264

Applicant(s)

CHEN, JIASHU

Examiner

Laura A Grier

Art Unit

2644

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-20 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-7 and 9-20 is/are rejected.
- 7) ☒ Claim(s) 8 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

**Priority under 35 U.S.C. §§ 119 and 120**

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) \_\_\_\_ 6) ☐ Other: \_\_\_\_

**DETAILED ACTION**

***Claim Rejections - 35 USC § 103***

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. **Claims 1-7** are rejected under 35 U.S.C. 103(a) as being unpatentable over Chen et al. in view of Nagamitsu et al., U. S. Patent No. 5467401.

Regarding **claim 1**, Chen et al. discloses methods and apparatus for producing directional sound. Chen et al.'s disclosure comprises means of determining a characteristic function, wherein the characteristic constitutes a head-related impulse response, means of applying the characteristic function as a filter, and means of converting the filtered signal to a sound wave thus providing/producing the sound wave to a listener (figure 5b, col. 6, lines 45-67 - col. 7, lines 1-5 and col. 8, lines 1-25). However, Chen et al. fails to specifically disclose the sound originating at a plurality of positions in space was well known in the art.

Regarding the sound originating at a plurality of positions in space, in a similar field of endeavor, Nagamitsu et al. (hereafter, Nagamitsu) discloses a sound environment simulator using a computer simulation and a method of analyzing a sound space. Nagamitsu teaches sound originating for a plurality of positions in space as well in relation to spatial characteristics at a sound receiving point R (col. 6, lines 39-42 and figures 5-6 and 13-14).

It would have been obvious to one of the ordinary skill in the art at the time the invention was made to modify the invention of Chen et al. by incorporating means wherein the sound originates at a plurality of positions in space for the purpose of enhance and/or improving real-time stereophonic virtual audio and designing efficiency by limiting computation as taught by Nagamitsu.

Regarding **claim 2**, Chen et al. and Nagamitsu (hereafter, Chen) disclose everything claimed as applied above (see claim 1). Chen et al.'s disclosure further support for the characteristic function comprising data information related to the environment in which the sound is perceived (col. 3, lines 63-64).

Regarding **claims 3-7**, Chen discloses everything claimed as applied above (see claim 1). Chen et al.'s disclosure further inherently provides support of a spatial feature extraction and regularization model; spatial component and temporal component (summed matrix of a predetermined number of eigen vectors ranging from 3 to 16); and wherein the components are determined by a Karhunen-Loeve Expansion (col.4, lines 24-67 - col. 5, lines 1-53).

3. **Claims 9-15** are rejected under 35 U.S.C. 103(a) as being unpatentable over Chen.

Regarding **claim 9**, Chen et al. discloses methods and apparatus for producing directional sound. Chen et al.'s disclosure comprises an input for receiving a signal representing a sound; and left and right channel with a filter array for applying a filter to the signal, in which the function of the filter comprises a head-related impulse response; and an output for converting the filtered signals to the binaural sound and producing a sound to the listener (figure 5a and col. 13, lines 24-59). However, Chen et al. fails to specifically disclose the sound originating at a plurality of positions in space was well known in the art.

Regarding the sound originating at a plurality of positions in space, in a similar field of endeavor, Nagamitsu et al. (hereafter, Nagmitsu) discloses a sound environment simulator using a computer simulation and a method of analyzing a sound space. Nagmitsu teaches sound originating for a plurality

of positions in space as well in relation to spatial characteristics at a sound receiving point R (col. 6, lines 39-42 and figures 5-6 and 13-14).

It would have been obvious to one of the ordinary skill in the art at the time the invention was made to modify the invention of Chen et al. by incorporating means wherein the sound originates at a plurality of positions in space for the purpose of enhance and/or improving real-time stereophonic virtual audio and designing efficiency by limiting computation as taught by Nagamitsu.

**Regarding claims 10-12**, they are interpreted and rejected for the same set forth in claims 3-5.

**Regarding claims 13-15**, Chen discloses everything claimed as applied above (see claim 9). Chen et al. further discloses comprises an environment input for receiving information of regarding the listening of the listener; means constituting a calculator with a computer program (figure 5a, col. 5, lines 58-65 and col. 7, lines 6-50).

4. **Claims 16 and 18** are rejected under 35 U.S.C. 103(a) as being unpatentable over Chen.

Regarding **claim 16**, Chen et al. discloses methods and apparatus for producing directional sound. Chen et al.'s disclosure comprises an environment input for receiving information of regarding the listening of the listener; means constituting a calculator with a computer program (col. 5, lines 58-65 and col. 7, lines 6-50); input for receiving a signal representing a sound; and left and right channel with a filter array for applying a filter to the signal, in which the function of the filter comprises a head-related impulse response; and an output for converting the filtered signals to the binaural sound and producing a sound to the listener (figure 5a and col. 6, lines 20-44 and col. 13, lines 2459). However, Chen et al. fails to specifically disclose the sound originating at a plurality of positions in space was well known in the art.

Regarding the sound originating at a plurality of positions in space, in a similar field of endeavor, Nagamitsu et al. (hereafter, Nagmitsu) discloses a sound environment simulator using a computer

simulation and a method of analyzing a sound space. Nagmitsu teaches sound originating for a plurality of positions in space as well in relation to spatial characteristics at a sound receiving point R (col. 6, lines 39-42 and figures 5-6 and 13-14).

It would have been obvious to one of the ordinary skill in the art at the time the invention was made to modify the invention of Chen et al. by incorporating means wherein the sound originates at a plurality of positions in space for the purpose of enhance and/or improving real-time stereophonic virtual audio and designing efficiency by limiting computation as taught by Nagamitsu.

Regarding **claims 14 and 18**, Chen et al. discloses everything claimed as applied above (see claims 9 and 16, respectively). Chen et al.'s disclosure further teaches a plurality of eigen filters in a range from 3 to 16. (figure 5a, col. 4, lines 39-67 and col. 5, lines 1-4).

5. **Claim 20** is rejected under 35 U.S.C. 103(a) as being unpatentable over Chen in view of Sekine et al.

Regarding **claim 20**, Chen et al. discloses everything claimed as applied above (see claim 16). However, Chen fails to specifically disclose a cross-talk canceller. The examiner maintains that a cross-talk canceller was well known in the art.

Regarding a cross-talk canceller, in a similar field of endeavor, Sekine et al. discloses a sound-image position control apparatus. Sekine et al.'s apparatus comprises a cross talk canceller. (Col. 5, 2nd paragraph).

It would have been obvious to one of the ordinary skill in the art at the time the invention was made to modify the invention of Chen by implementing a cross talk canceller prior to reproduction to speakers for the purpose of canceling/eliminating the cross-talk sounds which emerge when a person hears with both ears as taught by Sekine et al.

*Allowable Subject Matter*

6. **Claim 8** is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

*Response to Arguments*

Applicant argues that the Chen fails to teach spatial characteristics or the sound originating at a plurality of positions in space. However, Chen does disclose teachings of spatial characteristics, and thus the rejection of Chen supports the invention, with the exception of the sound originating at a plurality of positions in space. However, the examiner submits addition prior art that supports the claimed limitation of ... at plurality of positions... as well as computation of spatial characteristics as of the invention as amended.

*Conclusion*

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Laura A Grier whose telephone number is (703) 306-4819. The examiner can normally be reached on Monday - Friday, 7:30 am - 4:00 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Forester W. Isen can be reached on (703) 305-4386.

**Any response to this action should be mailed to:**

Commissioner of Patents and Trademarks


Washington, D.C. 20231


**Or faxed to:**

**(703) 872-9314 (for Technology Center 2600 only)**

Hand-delivered responses should be brought to Crystal Park II, 2121 Crystal Drive, Arlington, VA, Sixth Floor (Receptionist).

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 305-4700.

LAG   
April 22, 2002

  
FORESTER W. ISEN  
SUPERVISORY PATENT EXAMINER  
TECHNOLOGY CENTER 2600